

Claims

We Claim:

1. A method for reducing hydrogen sulfide emissions from asphalt, including asphalt polymer compositions, comprising adding an inorganic or organic metal salt H_2S scavenger to the asphalt in an amount effective to reduce the evolution of H_2S , where the metal of the metal salt H_2S scavenger is selected from the group consisting of zinc, cadmium, mercury, copper, silver, nickel, platinum, iron, magnesium, and mixtures thereof.
2. The method of claim 1 where reducing the evolution of H_2S comprises adding sufficient inorganic or organic metal salt H_2S scavenger to reduce the hydrogen sulfide to levels acceptable to OSHA.
3. The method of claim 1 where the hydrogen sulfide emission is reduced to about 50 ppm or lower.
4. The method of claim 1 where the inorganic or organic metal salt is added in an amount ranging from about 0.05 to about 3 wt% based on the asphalt.
5. The method of claim 1 where the inorganic or organic metal salt is selected from the group consisting of zinc oxide, cadmium oxide, copper oxide, magnesium oxide and mixtures thereof.
6. The method of claim 1 further comprising adding a crosslinker to the asphalt, where the crosslinker is selected from the group consisting of a sulfur-containing derivative and elemental sulfur and mixtures thereof.

7. The method of claim 5 where in adding the crosslinker, the crosslinker is further selected from the group consisting of elemental sulfur, mercaptobenzothiazole (MBT), thiurams, dithiocarbamates, mercaptobenzimidazole, and mixtures thereof.
8. The method of claim 5 where the total amount of crosslinker is present in an amount ranging from about 0.01 to 0.6 wt% active ingredients, based on the weight of the asphalt.
9. The method of claim 1 where the amount of asphalt is at least 5 lbs.
10. A method for preparing asphalt and polymer compositions comprising:
heating a mixture of asphalt and a vinyl aromatic/conjugated diene elastomeric polymer;
adding a crosslinker to the mixture, where the crosslinker is selected from the group consisting of elemental sulfur, mercaptobenzothiazole (MBT), thiurams, dithiocarbamates, mercaptobenzimidazole, and mixtures thereof; and
reducing the evolution of hydrogen sulfide (H_2S) by adding an inorganic or organic metal salt H_2S scavenger to the mixture in an amount effective to reduce the evolution of H_2S , where the metal of the metal salt H_2S scavenger is selected from the group consisting of zinc, cadmium, mercury, copper, silver, nickel, platinum, iron, magnesium, and mixtures thereof.
11. The method of claim 10 where reducing the evolution of H_2S comprises adding an excess of zinc oxide, where the zinc oxide is added in an amount at least 10 times more than that normally used.

12. The method of claim 10 where the inorganic or organic metal salt H_2S scavenger is added in an amount ranging from about 0.05 to about 3 wt.% based on the mixture.
13. The method of claim 10 where the inorganic or organic metal salt H_2S scavenger is selected from the group consisting of zinc oxide, cadmium oxide, copper oxide, magnesium oxide and mixtures thereof.
14. The method of claim 10 where the crosslinker is present in an amount ranging from about 0.01 to 0.6 wt% active ingredients, based on the weight of the asphalt/polymer mixture.
15. The method of claim 10 where the hydrogen sulfide emission is reduced to about 50 ppm or lower.
16. The method of claim 10 where the amount of asphalt is at least 5 pounds.
17. A method for preparing asphalt or asphalt polymer compositions with reduced hydrogen sulfide emissions comprising adding an inorganic or organic metal salt H_2S scavenger to the asphalt in an amount of about 0.05 to 3.0 wt% where the amounts are based on the asphalt or the asphalt polymer composition, where the metal in the inorganic or organic metal oxide H_2S scavenger is selected from the group consisting of zinc, cadmium, copper, magnesium and mixtures thereof.
18. The method of claim 17 further comprising adding a crosslinker to the asphalt or asphalt polymer composition, where the crosslinker is selected from the group consisting of elemental sulfur, mercaptobenzothiazole (MBT), thiurams, dithiocarbamates, mercaptobenzimidazole, and mixtures thereof.

19. The method of claim 18 where the total crosslinker is present in an amount ranging from about 0.01 to 0.6 wt% active ingredients, based on the weight of the asphalt or asphalt polymer composition.
20. The method of claim 17 where the hydrogen sulfide emission is reduced to about 50 ppm or lower.
21. An asphalt, including asphalt polymer compositions, comprising an inorganic or organic metal salt H_2S scavenger in an amount effective to reduce the evolution of H_2S , where the metal of the inorganic or organic metal salt H_2S scavenger is selected from the group consisting of zinc, cadmium, mercury, copper, silver, nickel, platinum, iron, magnesium, and mixtures thereof.
22. A road made from the asphalt of claim 21 and aggregate.
23. A roof sealed with the asphalt of claim 21.
24. A method of sealing a roof with asphalt comprising heating the asphalt of claim 21 and distributing it over at least a portion of a roof surface.
25. A method of road building comprising combining the asphalt of claim 21 with aggregate to form a road paving material, and using the material to form road pavement.
26. A method of reducing the formation of pyrophoric iron pyrite in a storage vessel comprising in any order adding asphalt to the vessel and adding an inorganic or inorganic metal salt H_2S scavenger to the vessel in an amount effective to reduce the evolution of H_2S from the asphalt, where the metal of the

inorganic or inorganic metal salt H_2S scavenger is selected from the group consisting of zinc, cadmium, mercury, copper, silver, nickel, platinum, iron, magnesium, and mixtures thereof.

27. A method of recycling asphalt comprising physically removing asphalt from a location and in any order reducing the size of the removed asphalt, heating the removed asphalt, and adding an inorganic or organic metal salt H_2S scavenger to the asphalt in an amount effective to reduce the evolution of H_2S , where the metal of the inorganic or organic metal salt H_2S scavenger is selected from the group consisting of zinc, cadmium, mercury, copper, silver, nickel, platinum, iron, magnesium, and mixtures thereof.

28. Recycled asphalt made by the process of claim 27.

29. Aggregate comprising an asphalt at least partially coating the aggregate, where the asphalt comprises an inorganic or organic metal salt H_2S scavenger in an amount effective to reduce the evolution of H_2S from the asphalt, where the metal of the inorganic or organic metal salt H_2S scavenger is selected from the group consisting of zinc, cadmium, mercury, copper, silver, nickel, platinum, iron, magnesium, and mixtures thereof.